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Assessment of Credit Accessibility to Construction SMEs in the South African Construction Industry using Binary Logistic Regression

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Abstract

Unavailability of credit, especially trade credit, is one of the primary reasons for high failure rate of construction SMEs. This paper empirically investigates the determinants of trade credit to construction small and medium enterprises (SMEs) in the Gauteng Province of South Africa. The data were obtained through questionnaire survey from 179 small and medium contractors who were conveniently sampled in the Gauteng province. Data analysis was done using Statistical Package for the Social Sciences (SPSS) version 22 software. Results indicated that managerial competency, the availability of business plan, relationship with financial institutions, location of the firm, firm size, firm tax number and incorporation are significant determinants of credit accessibility in South Africa. These findings could be useful to construction SMEs in identifying and accessing trade credit from financial institutions.

Keywords: construction SMEs, credit accessibility, Gauteng, logistic regression

1. Introduction

South Africa grieves from high unemployment with an official estimate of approximately 23.5% of the economically active population unemployed (Statistics South Africa Labour Force Survey, 2009). SMEs are therefore expected to be an important vehicle to address the challenges of job creation, sustainable economic growth, equitable distribution of income and the overall stimulation of economic development.In the South African context in the construction industry, small enterprise is defined as having less than 50 employees, having an annual turnover of less than R5million, while medium enterprises have between 51 and 200 employees and less than R20million turnover (National Business Act, 2004). SMEs contribute immensely to the gross domestic product of most countries including South Africa. According to Schumpeter, firms are the vital force behind the progress of capitalism.

The innovative activity of entrepreneurs feeds a creative ‘‘destruction process’’ by causing constant disturbances to an economic system in equilibrium, creating opportunities for economic. According to

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Maas and Herrington (2006) SMEs are seen as a significant component of the solution to SouthAfrica's development issues which include poverty, income inequality and unemployment. However, the creation rate of SMEs in South Africa as measured by the total early-stage entrepreneurial activity is one of the lowest in the world. Herrington *et al.* (2009) observe that in 2008, South Africa ranked 23rd out of 43 countries, with a Total Early-Stage Entrepreneurial Activity (TEA) of 7.8% which was below the average rate (10.6%) of all the countries surveyed by global entrepreneurship monitor.Despite their importance to the economy in South Africa, small and medium construction enterprises (SME) sector is described as largely underdeveloped and lacking the managerial and technical skills and sophistication enjoyed by larger well established firms (Department of Public Works, 1999). Martin (2010) opined that lack of knowledge including knowledge of pricing procedures, contractual rights and obligations; law, management techniques and principles as well as technology were a challenge to SMEs. Furthermore, SMEs are more likely to have limited formal education, which is based on a construction craft or trade training such as carpentry, plumbing, electrical installation and bricklaying. This training is probably in the form of learnership (CIDB, 2008). Past studies in South Africa revealed constraints and challenges of capacity and financial resources among SMEs (Fatoki, 2014; Agumba *et al.*, 2005). Grimsholm andPoblete (2011) inferred that SMEs are not able to access finance or credit hence it stifles their growth and capability.

According to FinMark Trust (2006) provides evidence that only 2% of SMEs in South Africa are able to access bank loans/credit and that the use of suppliers' credit to SMEs is virtually non-existent. Balkenhol and Evans-Klock (2002) put the use of trade credit to SMEs in South Africa at only 0.2%. Stiglitz and Weiss (1981) term this occurrence as credit rationing. According to Stiglitz and Weiss (1981) agency problems such as asymmetric information and moral hazards can impact on the availability of credit and hence the capital structure of SMEs. Stiglitz and Weiss termed this phenomenon credit rationing. The core of the argument is that suppliers of finance may choose (due to asymmetric information, adverse credit selection and monitoring problems) to offer an array of interest rates that would leave a significant number of potential borrowers without access to credit. This is a contrast to the situation in most developed countries. Statistics Canada (2007) points out that 45% of SMEs are able to access trade credit.

Trade creditors play a dominant role in the SMEs venture creation process. A study by the Kauffman Foundation (2007) on the capital structure decisions of SMEs in the United States of America finds that contrary to widely held beliefs that SMEs rely heavily on capital from family and friends, external debt financing such as bank credit and trade credit are the more common sources of funding for many new SMEs during their first year of operation. This is consistent with the pecking order theory, which expects firms to first use internal equity before moving to debt and external equity. Availability of debt finance (both from banks and trade creditors) is one of the reasons for high levels of entrepreneurship and relatively low failure rate of SMEs in developed countries.

According to the study done by Hawkins *et al.* (2000) on SMEs and access to credit in South Africa have completely ignored the impact of trade credit and focused mainly on bank credit. Wilson and Summers (2000) focused on the study of SMEs on the issues of credit in Africa and South Africa from the supply-side typically focus on bank credit and more particularly on bank credit. However, banks are not the only principal source of external finance for SMEs. Berger and Udell (2006) note that although trade credit is

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extremely important to construction SMEs, it has received much less interest than commercial bank lending which provides only slightly more credit to SMEs.

Trade credit provides a cushion during credit crunches, monetary policy contractions or other shocks that leave financial institutions less willing or less able to provide small business finance. Since only a limited number of SMEs have access to loans from financial institutions, trade credit may often be the best or only available source of external funding for working capital.

Construction SMEs may prefer trade credit financing during the early years when the risk of default is high. Also, trade credit is a substitute to bank credit for firms that are credit-rationed by banks. The question now is whether suppliers accept those requests. If they do, then trade credit could alleviate credit rationing for SMEs. This suggests that trade credit could be one of the solutions to the credit constraints faced by construction SMEs in South Africa.

According to Smorfitt (2009) SMEs in South Africa do struggle to raise finance from credit providers. The question is why? There has been little, if any, in-depth research into why trade creditors are not lining up to grant credit to SMEs in South Africa. That is, the reasons why debt is not available from trade creditors to SMEs in South Africa. Therefore, it is significant to understand the determinants of access to trade credit for SMEs in South Africa.

1.1 Problem statement

According to Agumba and Otieno (2005) stated that, it is accepted that SMEs are a vehicle of economic empowerment in the construction industry in South Africa. However, they are phased with an overabundance of challenges to be able to maximize their economic potential. Furthermore, construction SMEs find it difficult to access trade credit they applied for from the financial institution. It can be clearly indicated that there is lack of studies to determine the predictors determining trade credit and partial credit accessibility by construction SMEs.

1.2 Research question

Based on the above discussion, this study is guided by this single specific research questions: Whatdetermines access to trade credit among South Africa construction SMEs?

2. Literature Review

2.1 Trade credit and empirical evidence

According to Huyghebaert *et al.* (2006) trade credit arises when a firm purchases goods and services for which payment is delayed. It is animpulsive source of financing, as it arises from ordinary business transactions. Trade credit is usually extended for an intermediate period of thirty to sixty days at which point payment is due. If payment is not made on the date, financing charges are applied and trade credit becomes an alternative method of financing business expenses. Selima (2007) Also points out that trade credit theory can be broadly classified into four main groups. These are market deficiency asymmetric information, transaction costs, price discrimination and finance. The asymmetric information theory occurs when sellers face uncertainty about their customers' creditworthiness and financial health. Because of asymmetric information sellers cannot reliably make the bestselling decisions. Frank and Maksimovic

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(2004) opinion out that another theory of trade credit is the transaction costs theory. The combination of the supply of both goods and finance from one source can lead to cost advantages and to a reduction in transaction costs. Furthermore, when the transactions take place on credit, the timing of the payment is less uncertain which enables firms to improve their cash-flow forecasts and simplify cash management. Selima (2007) discusses the price discrimination theory of trade credit and points out that as demand for a product can vary, suppliers can manipulate the product price through the variation of the credit terms offered to each separate customer. So varying the trade credit terms gives the supplier a more flexible approach to pricing and to discriminate among customers, as it is much easier to adjust credit terms (based on the payment period) than product price in order to respond to fluctuating demand.Frank and Maksimovic (2004) opinion out that another theory of trade credit is the financing theory. When non-financial institutions offer credit, they play an intermediary role by obviating the need for purchasers to obtain finance from their banks to pay for their purchases. Furthermore, customers that are rationed by financial institutions tend to turn to trade credit, considering it a cheap way of getting short-term funds. So suppliers that are financially sound and can relatively easily get access to external funds tend to play this intermediary role by financing their customers' stock through trade credit. Therefore, trade credit becomes an attractive way of obtaining required contractions or other shocks that leave financial institutions less willing or less able to provide small business finance.

2.2 Challenges preventing SMEs from accessing credit

According to Alhassan and Sakara (2014), results, the factors that stifle SMEs from accessing trade credit are, management expertise, high default rate and monitoring as the challenges banks faced in giving trade credit to SMEs. Bondinuba (2012) found that the key challenges that make it difficult for SMEs to access finance include policy regulation, inadequate financial infrastructure, stringent collateral security requirement, and lack of institutional capacity of SMEs sector. The key barriers identified include informational barriers, lack of managerial skills within SMEs. Nkuah, Tanyeh and Gaeten (2013) found that financial activities such as business registration, documentation/recording, business planning, asset ownership, impact heavily on SMEs access to bank credits.

Other challenges that SMEs encounter when trying to access trade credit can be due to an incomplete range of financial products and services, regulatory rigidities or gaps in the legal framework, lack of information on both the banks and the SMEs side. Banks may avoid providing financing to certain types of SMEs, in particular, start-ups and very young firms that typically lack sufficient collateral, or firms whose activities offer the possibilities of high returns but at a substantial risk of loss. There are many challenges to construction development and growth. These include policies regulations, inadequate financial infrastructure, firm regulations, trade regulations, tax regulations, changing government policies, tax rates, corruption, labour regulations, cost of capital, and keen competition for limited opportunities (Uriyo 2004).

Kayanula and Quartey (2000) argued that factors like availability and cost of finance are the most common constraints faced by SMEs. Others are lack of collateral, informational barriers, regulations and rules that impede construction firms access to credit, the legal framework and policies around investment and financial institutions (FI's) lending are fundamental, lack of access to appropriate technology, weak institutional capacity, lack of management skills and training in the construction firms, and lack of proper

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book keeping. The legal and regulatory frameworks that exist in Ghana also fail to provide the right support infrastructure to facilitate SMEs lending by the financial institutions. The lack of collateral, lack of proper financial management, lack of fiscal incentives for SMEs, strict prudential regulations which restrict flexibility of FI's, unduly complex or onerous administrative procedures and even simply the lack of a consistent definition or enabling law for SMEs are some of the impediments to SMEs financing. Even though SMEs tend to attract motivated managers, they can hardly compete with larger firms.

Angela and Motsa Associates (2004) revealed that entrepreneurs face several problems in their efforts to access trade credit , particularly from banks; viz., lack of collateral security, refusal to use own collateral, failure to make a remarkable own contribution, blacklisting, failure to review attractive financial records and/or business plans and high risk of small entrepreneurs.

Foxcroft *et al.* (2002) explicates that lack of collateral is the most widespread problem, particularly if the entrepreneur is applying for working capital. Other issues affecting the decision to provide finance include blacklisting, and inadequate financial records. The report concluded that, based on international comparisons, for a significant proportion of unsuccessful applicants, the failure of the application would not seem to be entirely unreasonable.

The Organization for Economic Cooperation and Development (OECD, 2006) argued that banks may avoid providing finance to certain types of SMEs, in particular, start-ups and very young firms that typically lack sufficient collateral, or firms whose activities offer the possibilities of high returns but at a substantial risk of loss (OECD, 2006). It can be suggested from these discussions that different set of challenges prevents SMEs from accessing finance. Hence, the importance of determining the challenges faced by SMEs in the South Africa construction industry from accessing credit.

2.3 Determinants of access to trade credit

Fatoki (2014) in his study indicated that the availability of business plan, collateral, maintenance of a good relationship, managerial competency and a good credit score are critical lending requirements. In a study conducted by Kira and He (2012) in Tanzania, they found that there is interdependence and significant relationship between the firms characteristics i.e. location, industry, size, incorporation, age, size, availability of business information and collateral and access of debt to financing by SMEs.

According to Etonihu, Rahaman and Usman (2013) their findings suggested that education, distance to credit source and types of credit source as major factors that influenced farmers' access to agricultural credit. In a study by Chauke and Anim (2013) in South Africa they established that access to credit was negatively influenced by educational achievement, investment in production costs, access to market information and membership of cooperative. In a separate study by Chauke *et al.*, (2013) they found that the predictors for credit accessibility by smallholder farmers were, attitude towards risk, distance between lender and borrower, perception on loan repayment, perception on lending procedures and total value of assets. Ololade and Olagunju (2013) posited that gender, marital status, lack of guarantor, high interest rate predicted access to credit among rural framers in Nigeria.

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Fatoki and Odeyemi (2010) results indicate that managerial competencies, business information, networking, location, crime, business size and incorporation are significant determinants of credit approval. Dzadze, Osei Mensah, Aidoo, and Nurah (2012), in their study established that extension contact, education level and saving habit had significant positive influence on farmers' access to formal credit.

Kimutai and Ambrose (2013) opined that the key factors that influenced credit rationing by commercial banks in Kenya are loan characteristics, firm characteristics and observable characteristics. The study established that most of the banks rationed credit in order to reduce risk and to avoid the risk of adverse selection and moral hazard. Beck *et al.*, (2008) found that banks in developing economies, compared to those in developed economies, tend to be less exposed to SMEs, hence charge them higher interest rates and fees. Musamali and Tarus (2013) inferred that profile such as ownership structure; size of the firm; business type; and age of the business indeed influence SMEs' access to finance. Alhassan and Sakara (2014), results indicated that, the number of employees, experience in credit use and number of fixed assets possessed, attitude towards risk, business size, sector and form of business in the economy are the critical success factors in accessing bank finance. In a study by Pandula, (2011) using chi square as statistical parameter, found that, education of the entrepreneur and having membership with business association are associated with access to bank finance. In view of these discussions there is no consensus of a set of determinants that will predict access to credit. Furthermore, no study has focused on full or partial credit accessibility from the financial institutions. Hence, this research poses the question: what are the socio-economic and demographic predicators of full credit accessibility from the financial institutions?

3. Research Method

A structured questionnaire survey was used to collect data. Creswell (1994) describes a survey as a quantitative or numeric description of some fraction of the population – the sample, which enables researchers to generalize their findings from a sample of respondents to a population within the limitations of the sampling method. Convenience sampling was used which consisted of contractors registered with the CIDB. A total of 179 SMEs completed the questionnaire survey. Content validity was conducted on the questionnaire using pilot study administered to 30 construction SMEs.

SPSS version 22 was used to perform the binary logistic regression analysis. A binary logistic regression model with a dichotomous dependent variable of Yes or No was modelled. Yes response was defined as having accessed full trade credit and No accessed part of the trade credit. The dependent variable was coded as 1 and 0, for "Yes" and "No" respectively. The independent variables of the logistic regression model were also coded. They were the demographic and socio-economic characteristics of the SMEs: *gender* if male 1 and female 2; *age group,* 30 years and below 1, 31 years to 39 years 2, 40 years to 49 years 3 and 50 years and above 4; *current position*, director 1, owner 2, manager 3 and manager/owner 4; *ownership*, sole proprietorship 1, partnership 2, limited partnership 3, limited Liability company 4, corporation (for-profit) 5; *tax number* No, 0 and Yes, 1; *location of business*, city of Johannesburg Metropolitan Municipality 1, city of Tshwane Metropolitan Municipality 2, Ekurhuleni Metropolitan Municipality 4, West Rand District Municipality 4; *collateral* No, 0 and Yes, 1.

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Logistic regression is recommended over linear regression when modeling dichotomous responses and allows the researcher to estimate probabilities of the response occurring (Hosmer and Lemeshow, 2004). The logistic regression equation takes the following form

$$\ln (p/1-p) = \beta 0 + \beta 1x1 + \beta 2x2 + \ldots + \beta kxk \quad (1)$$

Where p is the estimated probability of passing, and x1, x2, …,xk are independent variables.

The estimated probability of the response occurring or passing (p) divided by the probability of it not occurring or not passing (1-p) is called the odds ratio. Maximum likelihood method is used to estimate the odds ratios of the model. Values of odds ratios higher than 1 indicatepositive association between the variables, odds ratios equal to 1 indicate no association, while odds ratios lower than 1 indicate negative association between each independent variable and the dependent variable of the model.

Furthermore, in order for an independent variable to be a predicator of the dependent variable the p-value should be less than 0.05 at 95% confidence, which connotes its significance in the model. In achieving a fitting model the Hosmer-Lemeshow goodness of fit test should be significant i.e. the value should be greater than 0.05 (Pallant, 2013).

The factors preventing SMEs from accessing trade credit were measured using Likert scale of 1 to 5. 1= Strongly disagree (SD), 2= Disagree (D), 3= Neutral (N), 4 = Agree (A), 5= Strongly agree (SA). The Likert-scale questions are discussed based on their mean score in the interval scale. The difference between the upper and lower ends of the used scale is 4.0 since there are five points. Each range can be equated to 0.80 because the extent of the range is determined by a division between 4.0 and 5.0 (4/5). However, in the current study the intervals are as stated:$> 4.21 \leq 5.00$ Strongly agree; $> 3.41 \leq 4.20$ Agree; $> 2.61 \leq 3.40$ Neutral; $> 1.81 \leq 2.60$ Disagree; $> 1.00 \leq 1.80$ Strongly disagree.

4. Results and Discussion

Table 1 indicates that male respondents were the majority than female respondents, at 63% to 37% respectively. Majority i.e. 51% of the respondents were in the age group between 40-49 years old. Furthermore, 82% of the respondents were owners of the organizations surveyed. Majority i.e. 72% of the respondents had business experience of between 6 to 10 years. 98% of the SMEs are sole. Furthermore, majority i.e. 41% of the SMEs were located in the city of Johannesburg metropolitan.

Table 2 indicates that the SMEs respondents strongly agreed that lack of collateral, lack of cashflow statement and owners equity were hindering SMEs from accessing credit from financial institutuions. The mean values were in the band of 4.21 to 5.00. The sector of the business, lengthy and vigorous procedure for credit application, high interest rates, location of the business were in the band of 3.61 to 4.20 suggetsing that the respondents agreed that they contributed to their difficulty of obtaining credit. Furthermore, the SMEs respndents disagreed that lack of appropriate eduaction and training, and lack of managerial ability were hindering them from accessing credit. These two constraints were in the band of 1.81 to 2.60.

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Table 1: Profile of respondents and organisation

		Frequency	Percentage (%)
Gender	Male	112	63
	Female	67	37
Age group	30 years and below	2	1
	31-39 years	49	27
	40-49 years	92	51
	50 years and above	36	20
Current position	Director	29	16
	Owner	146	82
	Manager	3	2
	Manager/owner	1	1
Experience	1-5 years	15	8%
	6-10 years	130	72%
	11-15 years	33	18%
	16-20 years	1	1%
Ownership	Sole proprietorship	175	98%
	Partnership	2	1%
	Limited partnership	1	1%
	Limited liability company (LLC)	1	1%
Location of company	City of Johannesburg metropolitan	74	41%
	City of Tshwane metropolitan	42	24%
	Ekurhuleni metropolitan	34	19%
	West Rand district municipality	29	16%

Table 2: Contraints in obtaining credit

Constraints of credit accessibility	Mean	Stdev.	Rank
Lack of collateral	4.69	0.58	1
Lack of cash flow statement	4.51	0.98	2
Owner's equity	4.39	1.01	3
Sector of the business	4.14	1.21	4
Lengthy & Vigorous procedure for credit application	4.13	1.37	5
High Interest rates	3.81	1.51	6
Location of the business	3.76	1.27	7
Lack of good reference on integrity	3.03	1.66	8
Lack of awareness of existing credit schemes	2.97	1.71	9
A general lack of experience and exposure on construction project	2.75	1.73	10
Lack of information on the cost obtaining such service	2.72	1.74	11
Lack of appropriate education & Training	2.21	1.68	12
Lack of managerial ability	2.09	1.59	13

The results in Table 3 suggest that out of the 179 respondents, one respondent did not get credit at all. Therefore, 21.91% i.e. 39 of the respondents received part of the credit they applied for and 78.09% i.e. 139 of the respondents obtained the full credit. It can be indicated that some of the SMEs did not receive the full credit they applied from the financial institutions. This is imperative to this study as there is lack of

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studies that have determined the predicators that influence full credit accessibility and partial credit accessibility globally.

Table 3: Full or partial credit accessed

Credit accessed	Respondents	Percentage
Accessed partial credit	39	21.91%
Accessed full credit	139	78.09%
Total	178	100.00%

The results in Table 4 indicate that of the seven demographic and socio-economic independent variables modelled to predict full credit accessibility. Age group 40-49 years were likely to receive full credit than applicants who were in the age group 30 years and below. This finding suggests that financial institutions might deem applicants who are 30 years and young as being risky clients. The results in Table 4 further indicate that the current position of the applicant predicted full credit accessibility. However, no category of current position in the organization stated indicated prediction of full credit accessibility. The results indicated the level of significance (p-value) were greater than 0.05 for all categories of current position in the organization. It was found that when the SMEs provided their tax number they had a greater chance of accessing full credit at 0.05, compared to those who do not provide there tax number. The level of significance was less than 0.05 at 0.015 hence a strong predictor. Furthermore, the SMEs whose premise were in Location, Ekurhuleni metropolitan municipality in Gauteng province had a higher probability of getting full credit, compared to SMEs in the city of Johannesburg metropolitan municipality. This predicator was significant at 0.043 which was less than 0.05. The odds of getting the full credit was 0.247 more than those in city of Johannesburg. The gender of the respondent, and type of ownership did not predict full credit accessibility. Furthermore, it is imperative to mention that collateral was not statistically interpreted in the output result of SPSS despite being included in the analysis as a predictor. However, prior to testing this model, the goodness of fit of the model was tested which indicated a good fit. This result was justified by the Hosmer and Lemeshow test. The significance of the model was greater than 0.05 at 0.271. The result suggests that the independent variables were fitting in the proposed theoretical model.

5. Conclusions and Recommendations

The study found that SMEs are stifled from accessing credit because of lack of collateral/security, lack of cash flow statement and owners' equity despite the results suggesting that majority of SMEs received the full credit they applied for compared to those who did not receive the full credit. However, this is still alarming as partial credit can hinder the progress of these organizations economically. It can be indicated that when SMEs receive part of the credit they might apply for credit in other financial institutions or request financial assistance from friends in order to cover for the deficit.

The researchers established that for SMEs to access full trade credit from the financial institutions age group, current position in the organization of the respondent applying for credit predicated full accessibility. Furthermore, tax number and location of the business in the Gauteng province were also

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predicators of full credit accessibility. However, the gender of the respondent, type of business ownership and collateral (security) did not predict full credit accessibility by SMEs. These findings should be interpreted with caution as SMEs from Gauteng were the only respondents who participated. It is opined that the results might have been different if a country wide survey was undertaken within construction SMEs.

Table 4: Predictors of accessing full credit

Variable	***Exp. (B) Odds ratio***	***95% C.I. for EXP (B) Lower***	***95% C.I. for EXP (B) Upper***	***P-value***
Gender (1)	2.102	0.929	4.757	0.075
Age group				0.133
31-40 years (1)	135383335.572	0.000	.	0.999
40- 49 years (2)	0.269	0.079	0.916	0.036
50 years and over (3)	0.668	0.215	2.074	0.485
Current position				0.040
Owner (1)	0.000	0.000	.	1.000
Manager (2)	0.000	0.000	.	1.000
Manager/owner (3)	2.191	0.000	.	1.000
Ownership				1.000
Partnership (1)	0.000	0.000 .		1.000
Limited partnership (2)	1.357	0.000	.	1.000
Limited Liability company (LLC) (3)	1.274	0.000	.	1.000
Tax number (1)	0.050	0.004	0.564	0.015
Location (municipality)				0.085
City of Tshwane Metropolitan Municipality (1)	0.785	0.218	2.828	0.711
Ekurhuleni Metropolitan Municipality (2)	0.246	0.063	0.958	0.043
West Rand District Municipality (3)	0.707	0.175	2.863	0.627
	34707472280 46773200.000			0.999

Dependent variable: full credit accessibility (0=partial credit; 1=full credit) sig. at 5%

Based on these findings, the researchers recommend that SMEs should provide the age, and current position in the organization of the person applying for the credit. Furthermore, they should provide the tax number and the location of the business in order for them to obtain full credit from banks. It is worth indicating that SMEs should also be aware of the requirements that the financial institutions will request them to submit as they apply for trade credit.

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In relation to these findings, the researchers propose the need to use other socio-economic and demographic factors that were not used in this study as the current factors are not exhaustive in relation to the full characteristic of SMEs. The factors recommended for testing are marital status of the applicant, bank account statement and managerial ability of the respondents.

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